

WE CLAIM:

1. A protective overcoat layer for a magnetic recording disc, said protective overcoat layer comprising:

a carbon-containing layer; and

a lubricant layer on top of the carbon-containing layer, the lubricant layer having a >CNO functional end group.

2. The protective overcoat layer of claim 1, wherein the carbon-containing layer comprises an H-doped, N-doped or F-doped carbon layer.

3. The protective overcoat layer of claim 1, wherein the lubricant layer comprises a layer of Z-disoc.

4. The protective overcoat layer of claim 1, wherein the carbon-containing layer has thickness less than 20 Å.

5. The protective overcoat layer of claim 1, wherein the lubricant layer comprises a mixture of Z-disoc and other functional and/or non-functional perfluoropolyether lubricants, wherein the Z-disoc is present in the mixture at a concentration of 1 to 100%.

6. The protective overcoat layer of claim 5, wherein the functional perfluoropolyether lubricants are selected from the group consisting of Z-diac, Z-dol, Z-dol-TX

and Z-tetraol, and wherein the non-functional perfluoropolyether lubricants are selected from the group consisting of Z-15 and Z-25.

7. The protective overcoat layer of claim 1, wherein the lubricant layer comprises:  
a first layer of lubricant having a >CNO functional end group on top of the carbon-containing layer; and  
a second layer of other functional and/or non-functional perfluoropolyether lubricants on top of the first layer.

8. The protective overcoat layer of claim 7, wherein the first layer of lubricant comprises Z-disoc.

9. The protective overcoat layer of claim 7, wherein the first layer of lubricant has a thickness between 1-15 Å, and wherein the second layer of lubricant has a thickness such that a total thickness of the first and second lubricant layers is less than 20 Å.

10. The protective overcoat layer of claim 7, wherein the functional perfluoropolyether lubricants are selected from the group consisting of Z-diac, Z-dol, Z-dol-TX and Z-tetraol, and wherein the non-functional perfluoropolyether lubricants are selected from the group consisting of Z-15 and Z-25.

11. A method of protecting a magnetic recording disc including a disc substrate having magnetic recording media thereon, said method comprising:
- depositing a carbon-containing layer on the magnetic recording media; and
  - depositing a lubricant layer on the carbon-containing layer, the lubricant layer having a >CNO functional end group.
12. The method of claim 11, wherein the carbon-containing layer has a thickness less than 40 Å, and wherein the lubricant layer has a thickness less than 20 Å.
13. The method of claim 11, wherein the carbon-containing layer is deposited on the magnetic recording media by DC magnetron sputtering, RF sputtering, PVD, CVD, PECVD, ion-beam or cathodic arc processes.
14. The method of claim 11, wherein the lubricant layer is deposited on the carbon-containing layer by in-situ or ex-situ dip-lube or vapor lube processes.
15. The method of claim 11, wherein the carbon-containing layer comprises H-doped, N-doped or F-doped carbon.
16. The method of claim 11, wherein the lubricant comprises Z-disoc.

17. The method of claim 11, wherein the lubricant layer comprises a mixture of Z-disoc and other functional and/or non-functional perfluoropolyether lubricants, wherein the Z-disoc is present in the mixture at a concentration of 1 to 100%.

18. The method of claim 17, wherein the functional perfluoropolyether lubricants are selected from the group consisting of Z-diac, Z-dol, Z-dol-TX and Z-tetraol, and wherein the non-functional perfluoropolyether lubricants are selected from the group consisting of Z-15 and Z-25.

19. The method of claim 11, wherein the step of depositing a lubricant layer on the carbon-containing layer comprises:

depositing a first layer of lubricant having a >CNO functional end group on top of the carbon-containing layer; and

depositing a second layer of other functional and/or non-functional perfluoropolyether lubricants on top of the first lubricant layer.

20. The method of claim 19, wherein the first layer of lubricant comprises Z-disoc, wherein the functional perfluoropolyether lubricants are selected from the group consisting of Z-diac, Z-dol, Z-dol-TX, and Z-tetraol, and wherein the non-functional perfluoropolyether lubricants are selected from the group consisting of Z-15 and Z-25.

21. The method of claim 19, wherein the first layer of lubricant has a thickness between 1-15 Å, and wherein the second layer of lubricant has a thickness such that a total thickness of the first and second lubricant layers is less than 20 Å.